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### **Impressions of Alaska.**

BY GRACE E. COOLEY.

A short trip of five weeks to southeastern Alaska must give only the merest impression of its beauties and resources, yet the mind is crowded full of memories of pleasant days, beautiful pictures and interesting questions about our "new Eldorado." This name has been justly given to Alaska, for its quartz ledges have been "prospected" by the gold-seeker from Fort Tongas to the Yukon, and to him the country is best known—even the Government exploring parties to the interior still following his trail. The rest of the world, held in check by the instant barriers to intrusion presented by the Coast range, skirt the shore and scarcely touch foot a mile from the sea; while the greater mass of travelers who "go to Alaska" sleep, eat and live on the steamer from Puget's Sound to Sitka and back to the starting-point. Hence we gain, at best, only a slight conception of this vast country, with its miles of unexplored mountains and plains, though the imagination is fired and the impression is vivid and lasting.

To the tourist, a trip to Alaska means ocean travel, with all of its delights and none of its disagreeable features. It means two thousand miles of panoramic scenery, as if Norway with its fiords and Switzerland with its glaciers and white peaks could be unrolled as a scroll and viewed from a steamer's deck. There are to be seen dome-like peaks, snow-capped like Ranier and Baker, sharp-pointed and glacier-bearing like Fairweather and Crillon. Here also are inlets and channels, deep and narrow, between high, rocky walls, with the Cascades on the east bathing their feet in the Pacific waters, and the mountain-tops of a submerged range closing the western view.

From Puget's Sound north for a thousand miles to 60°, to where the coast line turns to run directly west, the map shows a long series of passage-ways between a ragged coast and the fringe of out-lying islands, these last being only parts of the mountain-chain that dips into the sea from that lower portion in Washington which we call the Olympics. So deep are some of these passages that no anchorage is afforded, and so narrow that one well-remembered night, being caught by a sudden fog, we steered

by the echo of the ship's whistle from the cliffs on either side. Sometimes, without a foothold of beach, the steep slopes run up one thousand to three thousand feet, clothed to the top with evergreens and musical with waterfalls.

To the geologist this coast presents many interesting features, for forces of ice and water are still active and the mountains are of quite recent formation, so that many of the sharp peaks are still unworn by mountain torrents.

The artist sees gorgeous coloring, almost tropical luxuriance of verdure, beautiful head-lands, wonderful vistas, and has mountain, valley, cascade, and a strange, picturesque people as subjects of study.

The botanist is enough of a poet to share in the feelings of artist, geologist and tourist, though he may not in those of the gold-seeker, and to him it is a new world of tantalizing mysteries.

It comes so close to Kamschatka, that strange land, still wrapped in the weird twilight, through which, as imaginative school-children, we viewed its long, queer peninsula. Anything specifically "Kamschatkensis" would be strange indeed, and no doubt stray waifs from there are lurking in these forest shades or above them on the mountain tops. Perhaps, too, one may get here a glimpse of Japanese or Chinese flowers, for we are told of that Japan current, that tradition says brought the Klingets to these shores.

Furthermore, we are speeding toward the place where flowers have a day of twenty-four hours in which to deepen and strengthen their color and perfume, and Alpine and Arctic plants will always be loved by the botanist. So, while the tourist is enjoying a half-doze over his panorama from the steamer-chair, you are longing for a closer view of the plants that clothe the banks. You are wise, then, if you have taken a freight steamer, that can give you, while doing its own business at the canneries, from four to thirty-six hours on shore every day or two of the three weeks in which the trip is made.

At Loring, fairly down on the Alaskan coast, the shore is typical of what is to be seen for hundreds of miles farther north. A narrow trail runs along a tiny strip of beach to an Indian *rancherie* of a score of houses, all facing the shore and backed

against the rising ground of the mountain-side. Here it is a look straight up into the air to reach the sky-line, and the mountain is heavily wooded with evergreens.

Hemlock is abundant and beautiful, the branches of the *Tsuga Mertensiana* being more graceful than those of our eastern one, having a little the effect of a drooping Norway spruce, though of course the tree is of magnificent size and different proportions.

The Menzies spruce is the most common tree here, and in all the parts of Alaska that I visited, and is said to constitute nine-tenths of the coast forest. It is called the "Sitka Pine," and is cut for lumber in the settlements about Juneau. Its shape is like the fir of our Maine coast, presenting the same slender spires in the profile of an horizon line, but it stands one hundred and fifty or two hundred feet high, and measures six feet or more in diameter. Another evergreen, less common, is *Tsuga excelsa*, the yellow cedar or yellow cypress.

This forest forms the northern part of the most magnificent reach in the world, that which runs through British Columbia to Washington and Oregon, where the trees—influenced by the same conditions of warmth and humidity which operate here, but with shorter winters—reach their grandest proportions.

Taking a trail through the woods, we climb over logs by means of steps cut into the trunks; walk over logs or stumble over loose rocks, always under the cover of thick boughs, draped and festooned with mosses and lichens.

The commonest mosses are golden green *Hypnum*s, as *Hypnum loreum* and *triquetrum*, or the pale and matted *H. undulatum*; these, with such lichens as *Sticta Oregana*, *Usnea barbata*, *Alectoria ochroleuca*, vars. *sarmentosa* and *Fremontii*, swathe the branches with thick bands and render them graceful with delicate grey and black draperies. After a rain, when a tardily-setting sun throws its horizontal rays into these dark coverts, they are brilliant with gorgeous coloring.

Our path is stopped at last by a wall of rock, over which tumbles a cascade, half-hidden by the mosses and maidenhair ferns that the rocks carry. A step down from the fallen tree on which we are walking takes us into the deep moss carpet that everywhere covers the ground. Here are *Hypnum splendens*,

*Climacium Ruthenicum*, *Mnium punctatum* for the taller forms, and multitudes more. Meanwhile the eye is delighting itself in ferns, herbs and shrubs of all kinds. Here are *Aspidiums* and *Phegopteris* disputing with the mosses for foothold; *Maianthemum bifolium*, under var. *dilatatum*; *Clintonia uniflora*, with its one blue berry; *Cornus Canadensis*; and *Streptopus amplexifolius*, brightening with its half-ripe fruit the deep greens of the background.

And berry-bushes untold! One has said of Alaska, that God must have made this country with special forethought, for his creatures can live here without considering the question of "what shall we eat and what shall we drink,"—the berries, fish and fowl leave man nothing to labor for. We found strawberries, salmon-berries, two species of trailing *Rubus*, *stellatus* and *pedatus*; high blackberries, low blackberries, a raspberry, and four species of gooseberries and currants, all edible; *Sambucus racemosa*, of which the Indians are fond; *Viburnum pauciflorum*; *Vaccinium Myrtillus* and *ovalifolium*; the red blueberry, *parvifolium*; the Salal, so highly valued; a pleasant small cranberry and *Vaccinium Vitis-Idæa*, almost as good—enough for man and beast—Klinget and bear and duck.

I gathered nineteen of the twenty edible berries which a Chilcat missionary told me are to be found. Of these the salmon-berry, gathered in the summer and preserved for winter use in salmon oil, is most valued. It is a large salmon-colored or orange raspberry, very delicious when picked and eaten fresh from the bushes, though disappointing if bought from the Indians on the wharf, where the aroma of oil that pervades everything Klinget clings to them.

Juneau is a mining town, and is the largest in Alaska. It lies about 58° north latitude, and is overhung by a mountain three thousand five hundred feet high; fronts a long range on Douglas Island, while back of the town peak rises beyond peak. Here we made a stop of fifteen days, hospitably entertained by some sweet French sisters of the St. Ann's Mission, who have a school and miners' hospital here. I find an old map has "perpetual rain" written across the country at this place, but fortunately we had as many bright days for collecting as we could use, for so

saturated is the atmosphere that we were forced to resort to the laborious process of stove heat to dry our papers. Very few of our plants moulded, however, due to our care and to the precaution of poisoning our blotters before we left Seattle. Juneau has a reputation for more rain than Chilcat or Sitka, and a botanist friend speaks with enthusiasm of the clear, dry air he experienced in a short trip of thirteen days up the coast.

A delightful excursion from here is up Gold Creek Cañon for four miles and a half to Silver Bow Basin, a high level tract of a mile in width, completely shut in by mountains. In following Gold Creek up through the cañon we make a rise of two thousand feet, and for the whole distance we are charmed with the scenery, for the stream winds in among the mountains in such fashion as to open continually new vistas with other snowy summits. Here are alders and willows, with blackberry bushes for the undergrowth, the *Picea Sitchensis* raising its fair straight trunks above them. Ferns are abundant: *Aspidium spinulosum*, *Polypodium vulgare*, with other old friends, *Adiantum pedatum*, *Cysopteris fragilis* and the Beech ferns, *Phegopteris Dryopteris* and *polypodioides*. *Pteris aquilina* is here too, but is three, four or five feet high, and its downy fronds show it to be the var. *lanuginosa*. All the ferns are tall, but are familiar forms, the *Cryptogramme acrostichoides* being an exception to this rule. This is to be found covering the barren rocks of a landslide or the debris left from the miners' blasts. *Aquilegia formosa*, *Aconitum*, *Campanula*, *Circæa*, *Galium* and *Saxifraga* are found in profusion.

The *Asters* are of the division with narrow linear leaves, dark green in color, the heads being large, deep violet, with loosely imbricated involucre.

*Geranium erianthum*, the western form of our *maculatum*, differs little from it except in color and texture, but its pure blue blossoms are much more lovely. The *Saxifragas* are omnipresent in many plummy graceful shapes, and the *Streptopus* is another plant always to be met with. Mosses clothe every place left untrimmed with flowers.

Reaching the basin, we come to the largest placer gold-mine in the world, worked by mountain streams brought to bear upon the disintegrated rock by means of immense hydraulic rams, the

water with its charge of gold-dust and gravel being sent through a tunnel three thousand feet long, where quicksilver catches the gold.

Here are sphagnum swamps encircled by alders and willows, and whitened with *Eriophorum*s like our bogs at home in New England.

*Potentilla palustris*, which we find here, is an old friend, too, but the snowy slopes that wall us in remind us that we are in Alaska. These slopes are rich in brilliant flowering plants, particularly alpine and sub-alpine.

As we ascend along the snowy gorge, we meet above the tree-line and the salmonberry bushes a tangle of *Heracleum lanatum*, *Aquilegia formosa*, *Aconitum*, *Veratrum*, *Senecio*, *Valeriana*, *Geranium* and *Spiraea*. Then the flowers show broad belts of color: here are the rose purple and white *Epilobium latifolium*; golden *Geums* and *Ranunculus*; blue *Violas*; pink *Pyrola minor*; white *Polygonum viviparum*; white *Eriogynia pectinata* with its beautiful feathery vines; heath like plants, as *Cassiope*, in pink and white; *Bryanthus glanduliflorus*, yellow-green; *Silene acaulis*, showing a rich spread of pink; *Hieracium triste*, with black woolly involucre; *Anemone Richardsoni*, delicate yellow; white *A. narcissiflora*, and *parviflora* veined with purple. There were *Arnica*s, too, and representatives of *Saxifraga*, *Parnassia*, *Tofieldia*, *Gentiana*, *Pedicularis*, *Astragalus*, *Oxytropis*, *Habenaria*, *Stellaria*, and *Cerastium*, alpine *Salices* in full bloom, and many more, covering the steep mountain-side, where the loose rocks would seem to leave no chance for even a plant to find foothold. From the top the slope presents a gorgeous stretch of color long to be remembered!

In going to a new region the relative importance of certain genera hardly noticed at home comes out sharply.

The *Saxifrages* are here a dominating group, both as to abundance and variety.

The *Tiarella trifoliata* is graceful and delicate; *Mitella pentandra* and *Telima grandiflora* are sturdy, rough-leaved plants; *Boykinia major* is a plummy species, and covers the rocks with its white sprays. Over the bare landslides spread *Saxifraga leucanthemifolia* and *S. punctata*; and *S. bronchialis*, and *S. oppo-*

*sitifolia* creep over other barren places, the latter a most curious plant with sharply ciliated leaves, which are curiously punctured at the top, as if with a conductor's punch.

Even the Hydrophyllaceous plant *Romanzoffia Sitchensis* takes on the characters of the *Saxifrages* so that it deceived the very elect, and was at first put in the family with them.

Up and down the shore from Juneau are cañons, cut by the cold mountain streams, and to these we went for botanical specimens, learning to know the ill-traits of that pest of the prospector, the Devil's Club.

Climbing over a slippery tree-trunk covered with moss is not an easy task, and there stands always at hand this instrument of Satan, which you instinctively grasp to your sorrow, for the spines find means to punish you. You slip, perhaps, off this same log that is helping you over a bog of deep, moist mosses, and the declined stem of the plant sinks with you and acts as a lever to hit you in the face with the thickened end of the stem. It deserves its grotesque name of *Fatsia horrida*, yet it adds much to the beauty of the forest, with its thick, vine-like foliage, particularly in the fall, when, I am told, the leaves take on a soft yet brilliant orange-yellow color, giving to the otherwise sombre, evergreen shades an autumnal richness.

At Salmon Creek, where we saw the beautiful fish for which it is named, attempt to scale the fall of fifteen feet, we found the Siberian Lily, rich orange with dark brown markings; had our first experience of exploring a forest with no trail, and found the *Mertensia maritima* on the beach, that four years ago I found at Mt. Desert, Me. *Lysichiton Kamschatkensis* takes the place of our *Symplocarpus foetidus* in the swamp; and *Mimulus luteus*, *Claytonia Sibirica*, *Epilobium luteum* and *Impatiens fulva* border the brooks, which are too cold to support life themselves, being glacier or snow-fed all summer.

South of Juneau, Sheep Creek leads up a rocky gorge, choked with the brilliant greens of the mosses, to the upper pastures where the mountain sheep feed; here we found bears' tracks in the salmonberry bushes, and rejoiced in the sight of blue glaciers in the mountains. Here were *Coptis asplenifolia* and *Trientalis Europæa* and long reaches of scarlet *Castilleja*. I found



more Cottonwoods and *Viburnums* in the cañon than I found elsewhere, and the mosses and lichens would have repaid several days of botanizing.

In looking over the records I find that the Alaska botanizing has been chiefly done at Sitka and Unalashka, a few collections having been made on the Yukon. There is much rich material awaiting the systematic collector, and the wholly unexplored eastern slope of the Cascades will surely bring new species to light.

Macoun, in his "Catalogue of Canadian Plants," has indicated the results of the earlier and later botanists, and a glance at that list will show how much ground has yet to be explored.

Chilcat, at the entrance to the pass to the Yukon, is a level stretch between two mountain ridges lying at the northern extremity of the coast, where the turn westward is made. It must be rich in flowering plants, and the configuration of the land must make it a particularly interesting field for the botanist. A stop of thirty-six hours tempted us to remain for further exploration, but that was impossible. However, we visited an almost unexplored glacier (the Davidson), doing what no tourists had ever done before us, we were told. The glacier is a large one, but is slowly dying, the foot of it, which once pushed out into the sea, being now fronted by a terminal moraine from one to three miles broad. This is densely covered with vegetation, and would well repay a botanist's study.

Problems which confront a botanist in visiting a region new to him relate to the history of the flora spread out before him, its relation to the floras with which he is familiar, and the causes of difference. These questions find answer in the climatic influences of the present and those which have operated in the past; with, as well, the geologic history of the region, including great catastrophes, such as mountain building, subsidence or changes in climate due to ocean currents, or those vaster ones which produced a glacial period.

At present the climate of the southeastern coast of Alaska is mild and moist, being like that of Oregon and Washington, modified by the higher latitude, which brings with it long winters, when the moisture in the air, always abundant, falls in snow instead of rain, as farther south. These immense snow-fields, being

too large for the short summers even with their Arctic heat to melt, temper the otherwise unmitigated intensity of a sun that shines for the greater part of the twenty-four hours.

The isotherm of  $45^{\circ}$  passing through Sitka is the same as that of Montreal. The January mean temperature of 1888 was  $30.2^{\circ}$ , and August of the same year  $58.4^{\circ}$ , the thermometer rising to  $89^{\circ}$  and  $90^{\circ}$  on the hottest days. This mildness and moisture comes from the prevailing winds which blow in-shore from the warm equatorial current, that turns across the ocean from Japan and then sweeps down the coast, giving California its delightful climate and making the most magnificent forest belt in the world. The trees are few in species, mostly conifers, with a sprinkling of cottonwoods, but they are densely crowded and grand in height and diameter, their coverts luxuriating in mosses and lichens.

The long winter, with its abundant congelation, and the short summer, effect a snow-line which is comparatively low at Juneau,  $58^{\circ}$  north, being about 3,500 feet. This produces a crowding of the plants, alpine and sub-alpine, low down upon the mountains, particularly where the glaciers descend to the sea.

In a climb of three thousand feet one passes species found in California, Washington, New England, Greenland and Labrador, or finds the same species in fruit, flower and bud. Looking over the plants of my collection, I note that they fall into four classes according to distribution.

First, those confined to the range of the forest belt; *i. e.*, from the Aleutian Islands to California, climbing the mountains as they descend; such are:

*Gentiana Douglasiana*, Bong.

*Vaccinium parvifolium*, Smith.

*Romanzoffia Sitchensis*, Bong.

Second, those which follow the mountain ranges southward, and extend eastward to the Rocky Mountains:

*Bryanthus glanduliflorus*, Gray.

*Castilleja miniata*, Dougl.

*Mimulus luteus*, Linn.

Third, those plants whose range is eastward to New England, and westward to Japan or Siberia:

*Cornus Canadensis*, Linn.

*Heracleum lanatum*, Michx.

*Veratrum viride*, Ait.

*Streptopus roseus*, Michx.

Fourth, those cosmopolitans of the Arctic circle or alpine plants which find a home in Greenland, Arctic America, Europe and Asia:

*Pedicularis Langsdorffii*, Fisch.

*Ranunculus pygmaeus*, Wahl.

This classification marks, perhaps, degrees of vigor in withstanding climatic influences, the last group being the hardiest in constitution, the first being most affected by disturbing influences, and so occupying only the narrow belt which was most conducive to their well-being. I like to think of Alaska as being near the home land of the present earth's flora, within that circle of distribution around the pole, whose radius met the circumference in Greenland on the one hand and Europe on the other; when, in the tertiary period, the temperate floras stood together north of the Arctic circle.

The mind surveys the change that drove before the advancing glaciers the present Arctic plants down to the latitude of the Ohio, and sees again the return of the exiles north toward their trysting-place, until we find the best travelers close up to the Arctic circle, uniform or nearly so around the pole, while lower down the weaker brethren remain in widely different belts, or perhaps are slowly traveling still, though far in the rear. In the first group we find distinctively western forms of not so close relationship to those of Asia as are the eastern American, due probably to the fact of the great elevation and longer glaciation of the west coast.

Here in Alaska we have mountains which seem not to have been free of ice since the glacial period; so here we appear to stand on the borders of the retiring ice age, and survey from this vantage ground the present world-flora and the mysteries of its past history.

Scores of questions which sought to penetrate that mysterious past crowded the mind on that wonderful day when we invaded the ice-fields themselves and steamed fearlessly up Glacier Bay among the threatening icebergs, and anchored under the mile-

wide façade of the great Muir glacier, lifting its blue wall of ice two hundred feet above the bay. Here we were in the very workshop of Nature, and world-building was in active process with the wonderful implement that the glacier has proved to be still working its will upon the plastic earth.

Glacier Bay is thirty miles long, and hundreds of acres of ice from a dozen glaciers are pushing relentlessly down to the sea from such peaks as Crillon and Fairweather, that tower in majestic whiteness fifteen thousand and sixteen thousand feet above us.

It is a weird and magnificent scene! The bare, brown shores are scoured and scored with recent ice; the blue bay floats icebergs of curious forms, all rich in coloring, pure white, deep blue or green, or shaded and toned with debris, while over beyond the peaks of the Fairweather range stand shoulder to shoulder in quiet, calm majesty.

What is this activity we see before us? What is Nature about? Have we indeed tracked the glacial period to this point in its retreat from the South, or have these mountains arisen since then? It is a retreat, surely, for high above our heads, two thousand feet up the mountain side, we see the footprints of former ice-fields, while the flowers, *Epilobiums* and Gentians, are waving their gay pennons of triumphant advance wherever the moraine gives them vantage ground. Is not this the place to study the floral repeopling of the Northern areas?

Dr. Russell, in his account of the expedition to Mt. St. Elias, speaks of Blossom Island, surrounded by perpetual snow, yet producing spruces, ferns, hellebore, gentians, orchids and berry-bushes. Who will tell us how these adventurers came there? What means of dissemination or strength of constitution have they that gives them the advantage?

Another question meets us: if, indeed, our temperate floras are on the march, in what order have the exiled plants followed the glaciers? Is it mere hardiness of constitution or better means of dissemination that bring the birch and alder close up to the Northern tree-line? Is the oak as sure to follow, but by easier stages, as befits its dignity?

We have been too prone to consider our present floras as fixed, but are there not many indications of change under our

eyes to-day? Dr. Gray and Dr. Hooker have left many problems of distribution for us younger ones to puzzle over.

A look to the future shows us that many fossil treasures are in this retreat of the ice slowly coming to light again. To those already found we owe much that we know of the history of the tertiary period, but that history will surely be rendered more vivid if a few generations of note-taking botanists study on their own ground the rapidity with which vegetation follows the retreating glaciers, and learn the order of its march.

Alaska will give us object lessons, if we will but heed them, and no more interesting or accessible field presents itself to American botanists.

### *Leucobryum minus*, Hampe.

Through the kindness of Mr. Carruthers and Mr. Gepp of the British Natural History Museum, I have been able to see the type of this species, which has been variously confounded with *L. albidum* (Brid.) Lindb. by European authors, including Braithwaite in his supplement to the British Moss-Flora, p. 295, and Limpricht in Rabenhorst's Kryptogamen Flora, iv., 421. Authentic specimens, compared with the type, were sent to Dr. Braithwaite, and he admits that all the synonymy on page 296 l. c., except the last line, should be omitted. Mr. Kern also kindly sent a specimen of his Lago Maggiore collection, mentioned by Limpricht, l. c., and this also proves to be not our *L. minus*, Hampe, but the species known as *L. albidum* (Brid.) Lindb. Hampe's specimen was collected in "lignis putridis, ad flume Savannah, Ga.," by Beyrich, and is the characteristic moss of our Southern States, distributed by Sullivant in his Musci Alleghaniensis, No. 169, as *Dicranum glaucum*, var. *albidum*, Brid. from Georgia, Alabama, and Louisiana; also by Austin in his Musci Appalachiani, 477, as "*L. vulgare*, var. *minus*, (*L. minus*, Hampe) from the Southern States, common;" but the reference to Sullivant Mosses U. S., page 24, is wrong, as Sullivant referred to the smaller of the Northern States species, which has been separated from *L. glaucum* (L.), and which is identical with the European specimens described by Braithwaite and Limpricht. Sullivant and Lesquereux are partly responsible